

Fish Population Estimates of Leviathan and Bryant Creek Watershed Using Depletion Removal Electro-Fishing Oct 28-31, 2013

**Toby McBride, John Henderson – USFWS, Sacramento
Leviathan Mine TAC meeting – January 9, 2014**



FIELD PERSONNEL

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**Leviathan Mine
Natural Resources Damage Assessment
Phase I Fisheries Assessment**



California Department of Fish and Game
October 2000



**Results of Fish Surveys in the Leviathan Mine Area
In Fall 2006**

Prepared for the
Leviathan Mine Council

Prepared by John Hanson
Biologist (Marine/Fisheries)
California Department of Fish and Game
May 30, 2007

**Previous studies were conducted in
Fall 1998 and 2006 by CDFG.
USFWS assisted in 1998.**

**Same fishing techniques were followed
Same locations were revisited (some
movement due to recent beaver
activity).**





Fish Species Encountered

INTRODUCED

Rainbow Trout (*Oncorhynchus mykiss*)

Brown Trout (*Salmo trutta*)

Brook Trout (*Salvelinus fontinalis*)



NATIVE

Lahontan Cutthroat (*O. clarki henshawi*)
Federally Threatened

Speckled Dace (*Rhinichthys osculus*)





**Surveys conducted Oct 28-31, 2013
Encountered light snow on 28-29th.**

**Sub-sample of fish were collected by
AMEC for chemistry analysis**

**Water temperature, pH,
conductivity, dissolved O₂, and
stream flow data were collected at
each site at same time.**





300 Ft Segment Identified

Block net strung across face of creek, at the downstream point .

Second net placed at the upstream stretch of the segment.

Beginning at the downstream end, the shocker, flanked by two netters, slowly made their way up the segment.

Additional person followed behind to collect captures into 5 gal bucket.





Fish captured were kept in an aerated bucket until measured.

All fish were identified to species, weighed, and measured (fork length and total length).

Three passes were conducted at each segment, resulting in presumed depletion of fish in the segment.

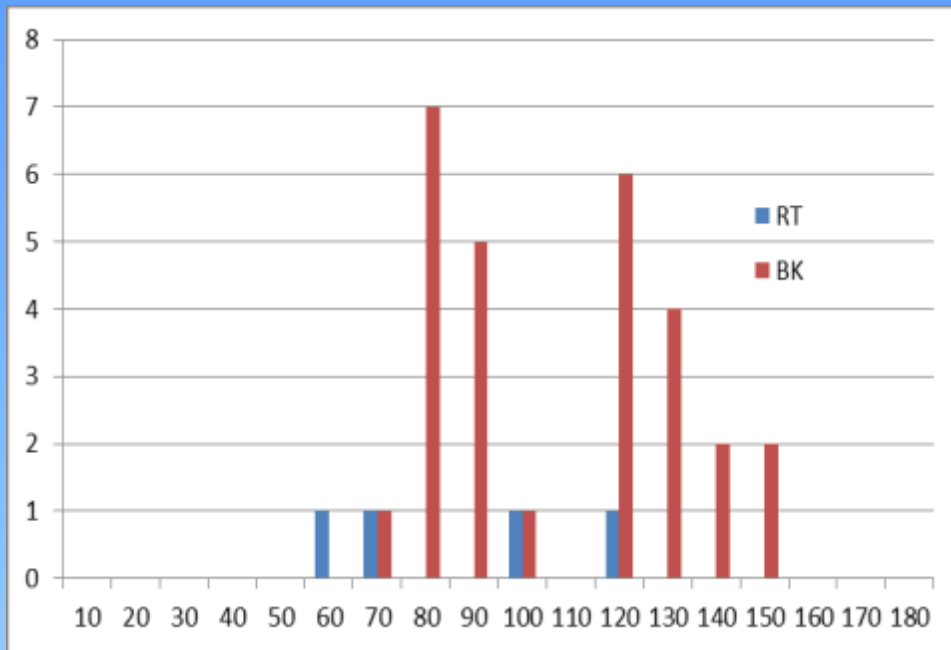


Population estimates were calculated using
MicroFish 3.0 (Demonstration Version)

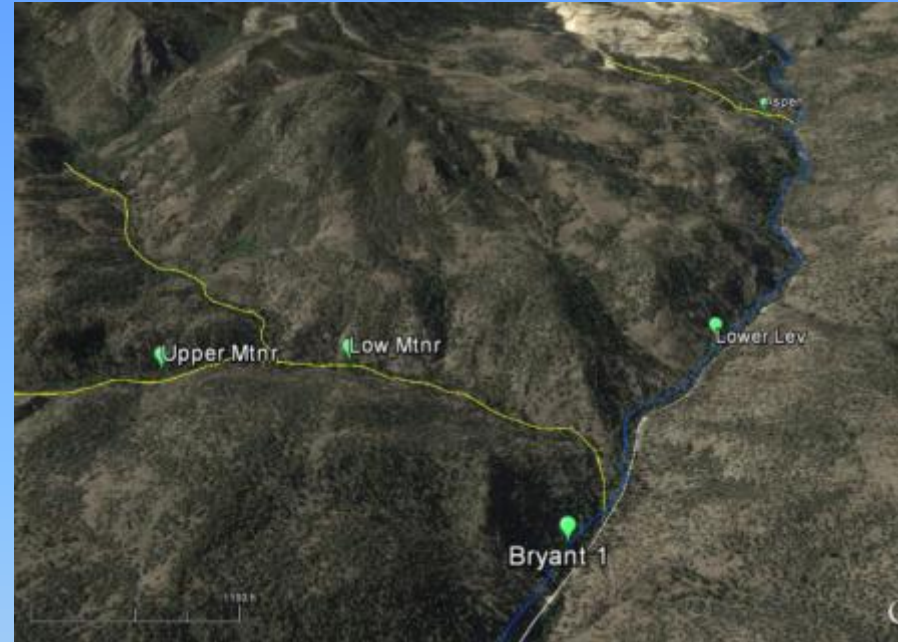
Software calculates
maximum-likelihood population estimates
from removal-depletion sampling data.



Lower Leviathan



Fish Length (total) - mm



1998			RT	BK	BN
	Low Lev	COUNT			
		POP EST			
2006					
	Low Lev	COUNT	1	1	
		POP EST	17	17	
2013					
	Low Lev	COUNT	4	28	
		POP EST	72	521	

Pop Est - Calculated as fish/stream mile

- Substantial increase in fish population from 1998 and 2006.
- Predominantly Brook Trout.
- Two size class groupings apparent.



Aspen Creek

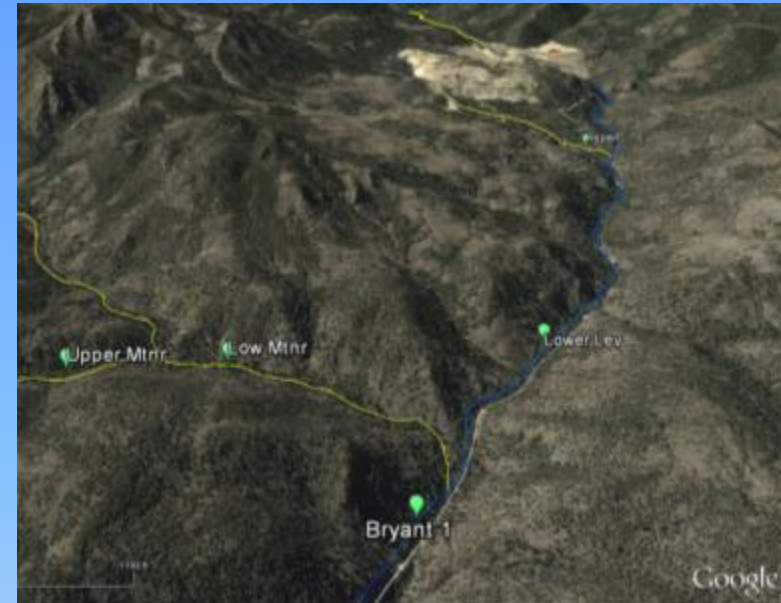
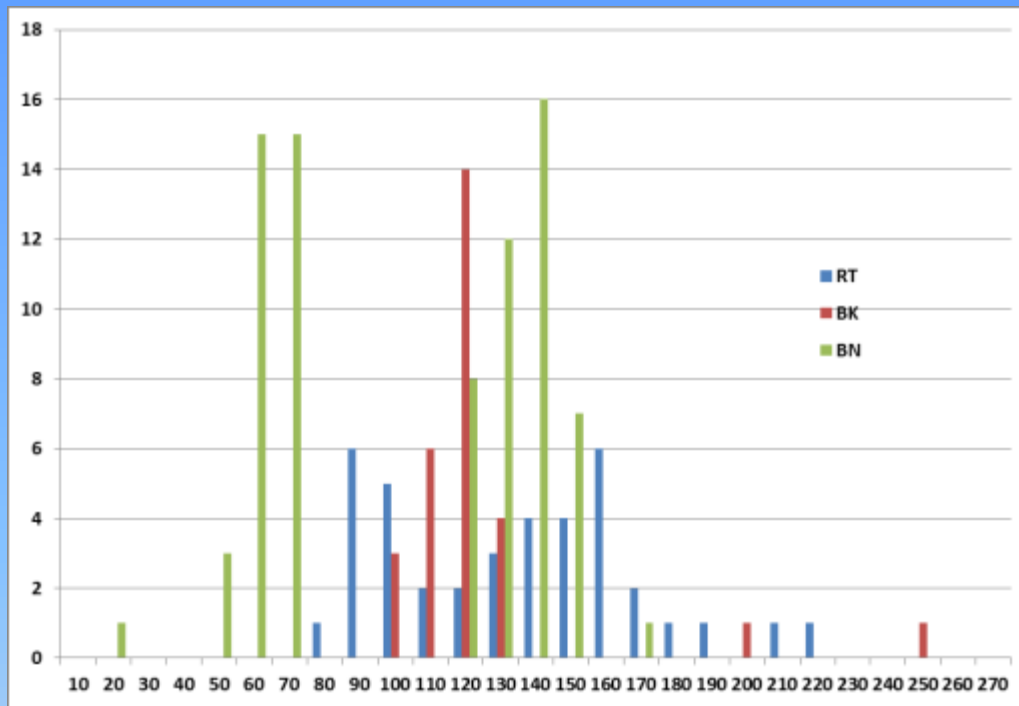


No fish were captured during all three survey years.

Reasoning unclear as to lack of fish observed.



Bryant 1

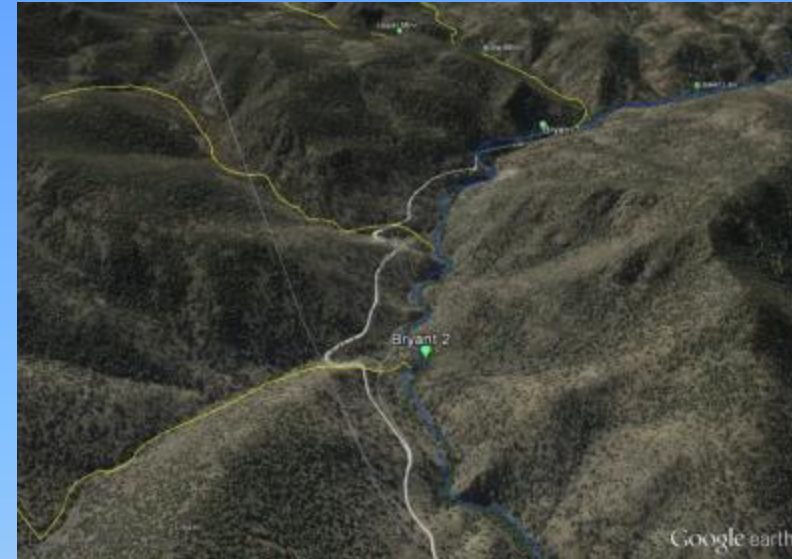
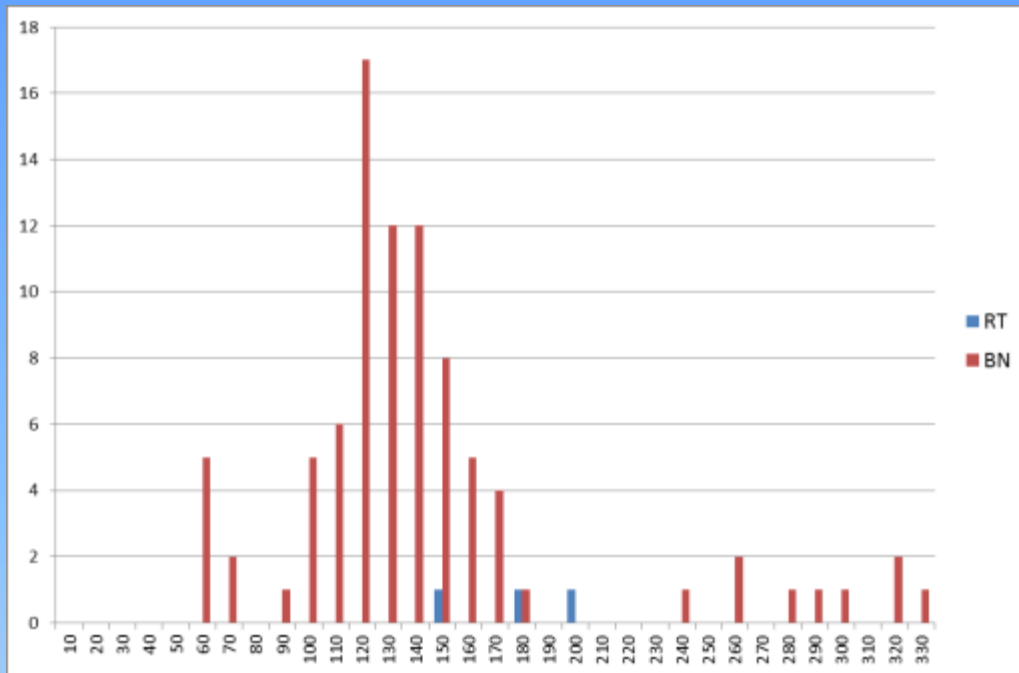


			RT	BK	BN
1998	Bryant 1	COUNT	4	1	
		POP EST	64	16	
2006	Bryant 1	COUNT	20	17	
		POP EST	320	272	
2013	Bryant 1	COUNT	39	29	78
		POP EST	728	528	1657

- Four-fold increase in population from 2006.
- Noteworthy appearance of Brown Trout.
- Several size-classes apparent.



Bryant 2

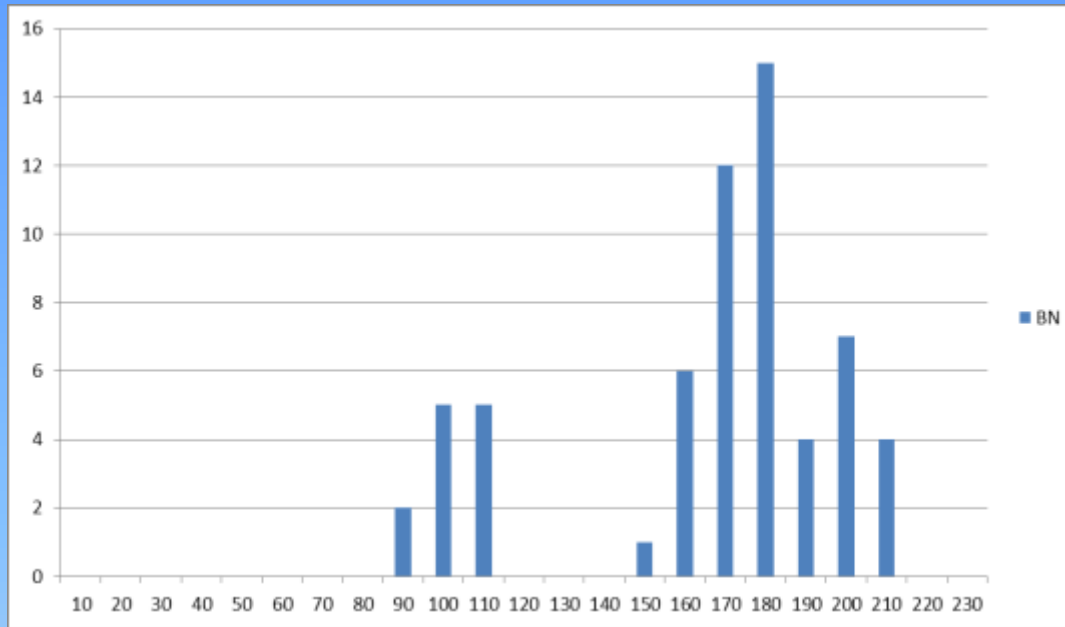


1998			RT	BK	BN
	Bryant 2	COUNT			
		POP EST			
2006					
	Bryant 2	COUNT			
		POP EST			
2013					
	Bryant 2	COUNT	3		87
		POP EST	49		1613

- Notable increase of fish compared to previous years.
- Predominantly all Brown Trout.
- Several mature adults collected (up to 1')



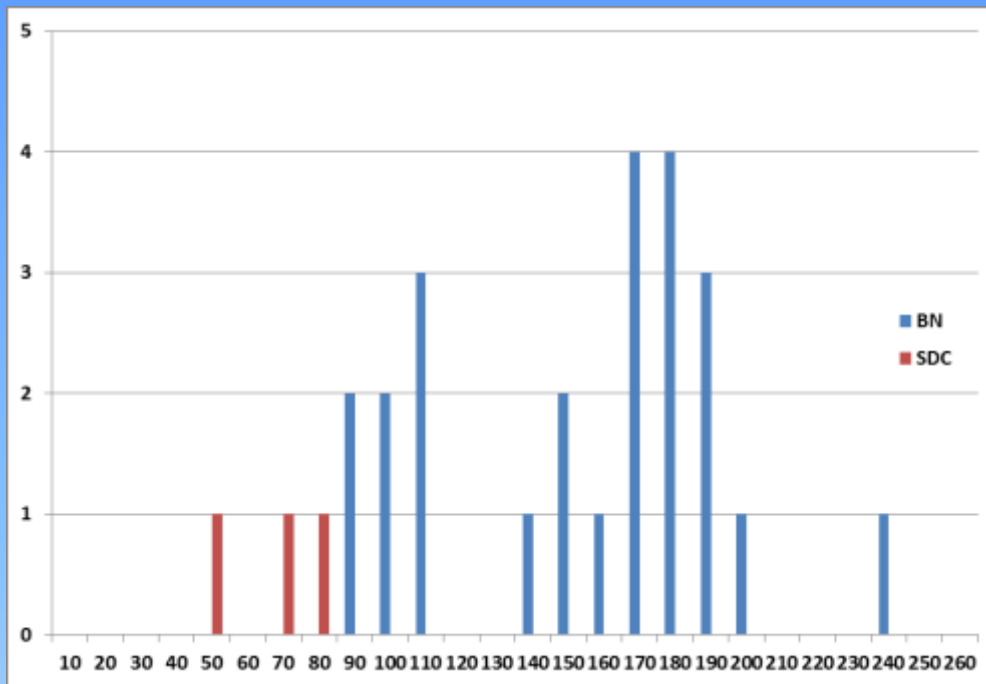
Bryant 3



1998			RT	BK	BN
	Bryant 3	COUNT	1		1
		POP EST	16		16
2006					
	Bryant 3	COUNT			15
		POP EST			570
2013					
	Bryant 3	COUNT			61
		POP EST			1171

- Estimated population double compared to previous sampling.
- Solely Brown Trout collected.
- Majority of larger size classes.





Bryant 4

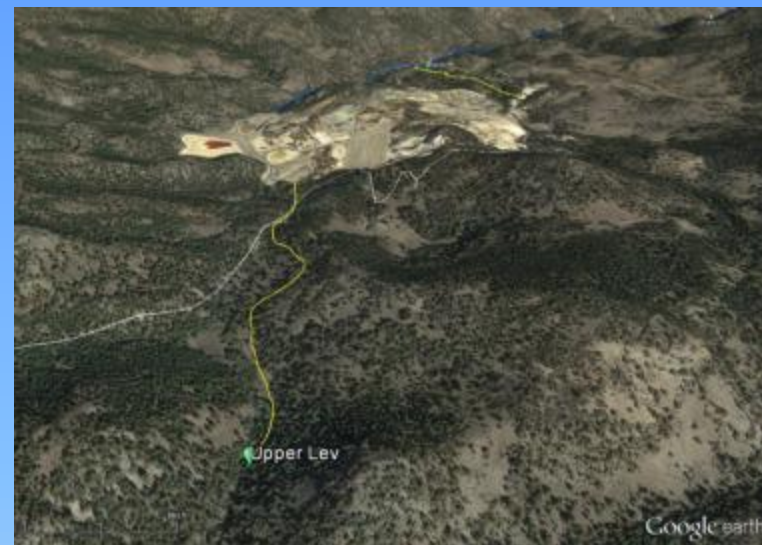
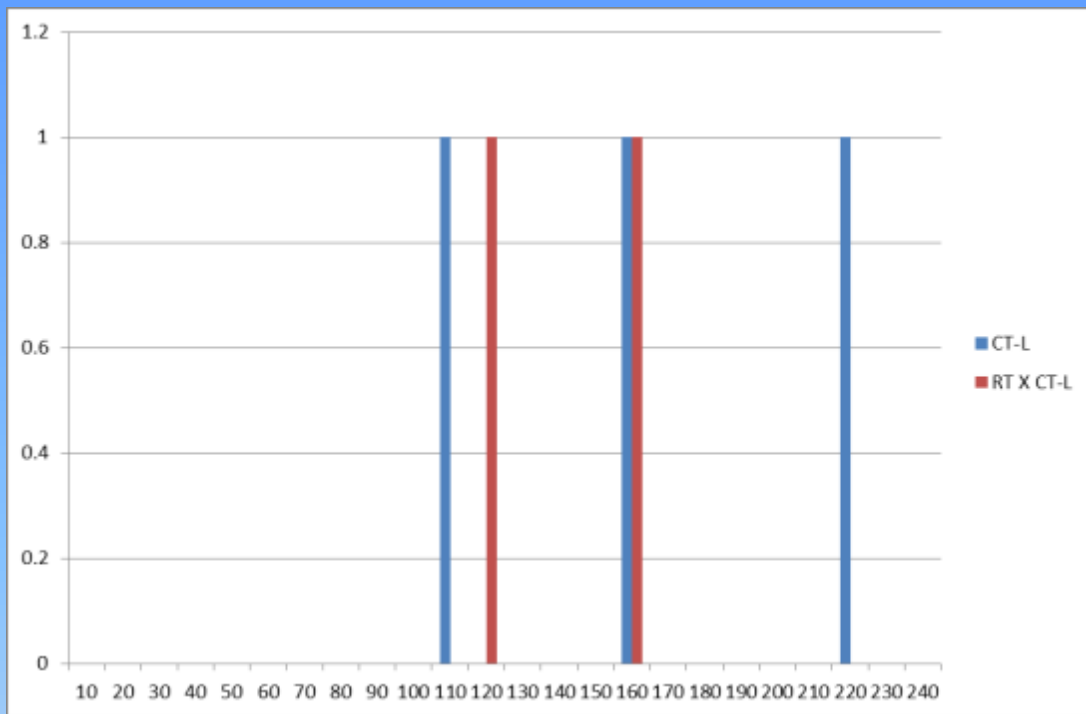


1998		RT	BK	BN	MWF	MSKR	SDC
	Bryant 4	1		1	7	155	9
		19		19	139	3446	179
2006							
	Bryant 4	5		8	1	58	63
		88		140	17	1161	315
2013							
	Bryant 4			24			3
				432			48

- Increased numbers of Brown Trout collected.
- Notable lack of other species (Rainbow Trout, Mountain Whitefish, Mountain Sucker).
- Significant beaver activity in sampling area.



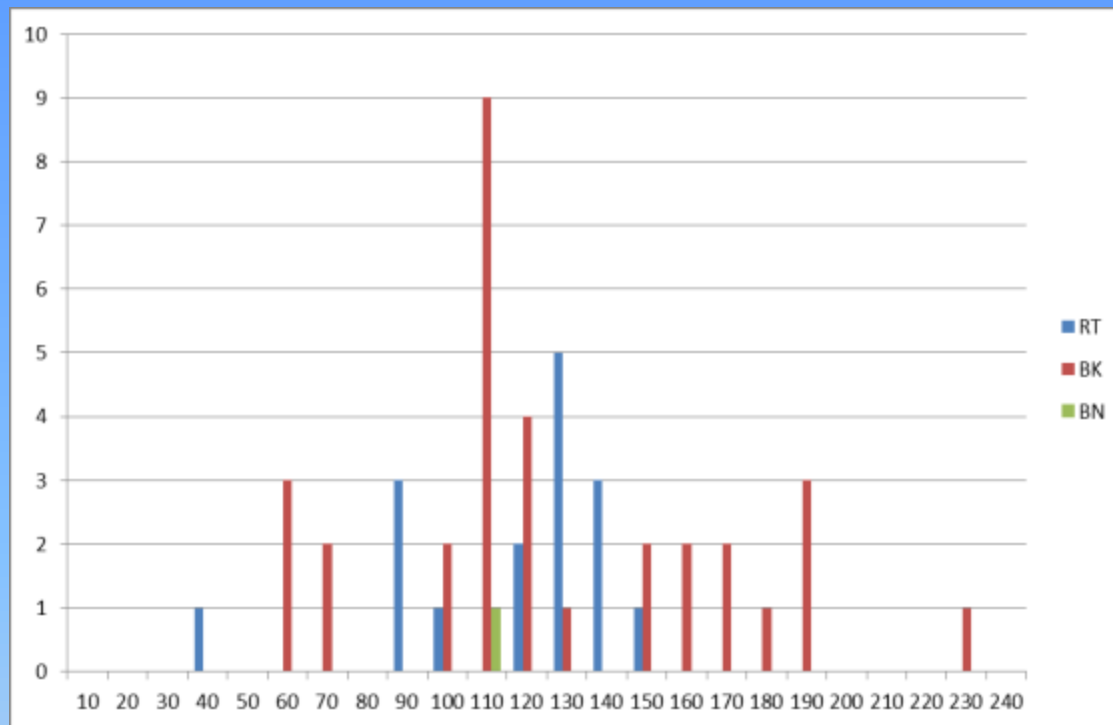
Upper Leviathan



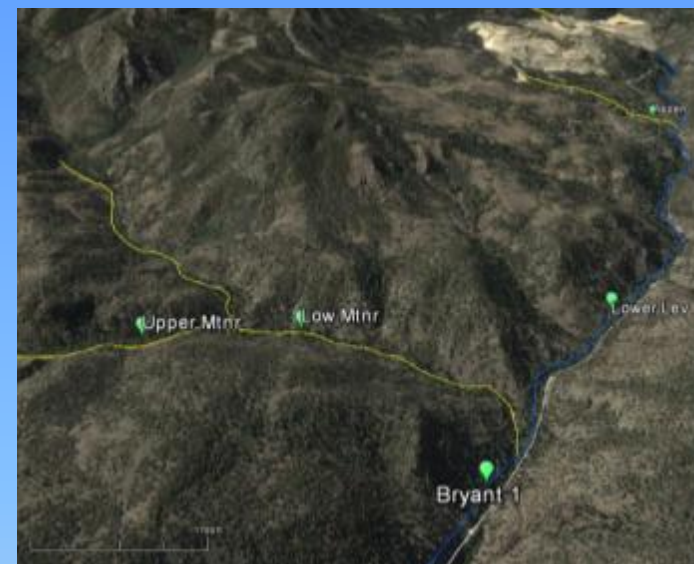
- Mature LCT and hybrids collected.
- Lack of Rainbow Trout

1998			CT-L	CT-L x RT	RT	BK	BN
	Upper Lev	COUNT	1	2	41		
		POP EST	17	35	721		
2006							
	Upper Lev	COUNT			44		
		POP EST			809		
2013							
	Upper Lev	COUNT	3	2			
		POP EST	62	-			





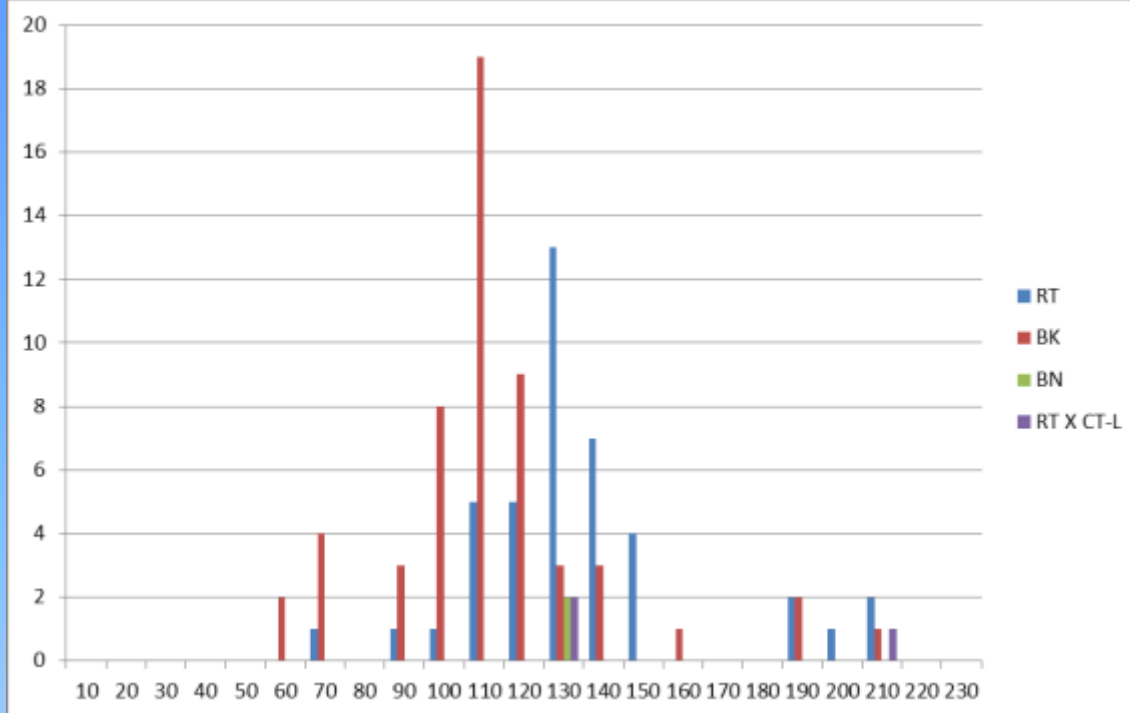
Upper Mountaineer



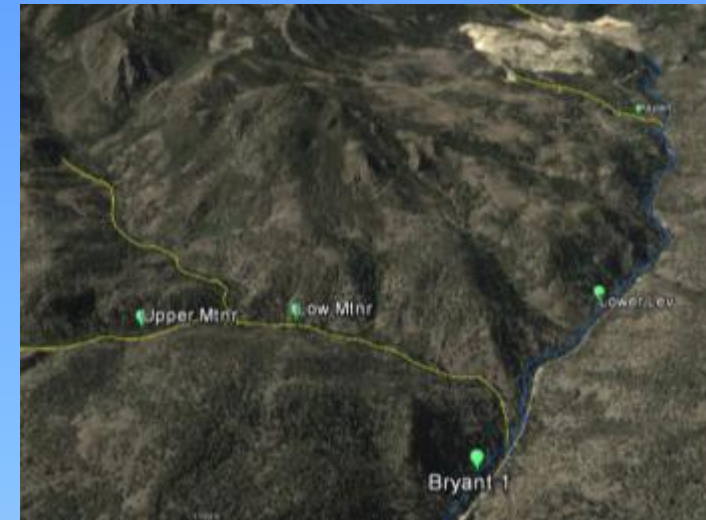
- Overall population appears steady from previous years.
- Notable decrease in Rainbow Trout, due to increased presence of Brooks.
- Spread of size classes appears to show a stable local population.

1998			RT	BK	BN
	Upp Mntr	COUNT	52	10	
		POP EST	915	176	
2006					
	Upp Mntr	COUNT	13	46	
		POP EST	221	783	
2013					
	Upp Mntr	COUNT	16	32	1
		POP EST	294	606	-





Lower Mountaineer



- Overall population appears steady from previous years.
- Notable decrease in Rainbow Trout, due to increased presence of Brooks.
- Single LCT Hybrid captured
- Spread of size classes appears to show a stable local population.

1998			RT	BK	BN
	Low Mntr	COUNT	83	17	
		POP EST	1441	284	
2006					
	Low Mntr	COUNT	54	30	
		POP EST	968	528	
2013					
	Low Mntr	COUNT	42	55	2
		POP EST	732	958	-



Summary

Overall, fish populations have increased at impacted reaches, likely reflecting improving conditions in the Leviathan/Bryant watershed since 2006.

- Trout populations have increased dramatically at Lower Leviathan and Upper Bryant Creek.**
- Total populations in Mountaineer Creek (control) has stayed static, although species composition appears to be changing.**
- A remnant population of Lahontan Cutthroat Trout appears to be surviving in Upper Leviathan Creek. However, the reasoning for a dramatic reduction of resident Rainbow Trout is unclear.**
- Brown Trout appear to be slowly 'out-competing' Rainbow and Brook Trout in the Bryant watershed, while Brook trout appear to be 'out-competing' Rainbows in the upper tributaries.**
- Beaver activity in lower Bryant Creek is resulting in extensive ponding. Effects on fish populations is unclear.**